

S A R V E R
H E A R T
C E N T E R

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Issue 37

The Jack G. Copeland, MD, Endowed Chair of Cardiothoracic Surgery



To honor Dr. Jack G. Copeland's 25 years as a distinguished faculty member, accomplished surgeon and renowned scientist, grateful patients, friends and colleagues have established an endowed chair in support of the cardiothoracic surgery team under his leadership. The goal is to fund the chair at the minimum level of \$2 million. To date, 403 donor families have contributed immediate gifts of \$319,328, pledged gifts of \$537,000, and planned gifts of \$50,000 – for a total of \$906,238.

The goal is to complete the effort by the evening of Friday, Nov. 7, 2003, at which time all donors to the fund will gather at a dinner celebration. To learn about how you can help complete this tribute, please turn the page.

Dr. Copeland performs a heart transplant at University Medical Center.



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Jack G. Copeland, MD, was born in Roanoke, Va., in 1942. He is married to Jan and has two children – Patrick, a computer scientist with Microsoft in Seattle, and Jennifer, a child psychologist in Colorado Springs.

His education includes a bachelor's degree in biology from Stanford University in 1964, a medical degree from Stanford in 1969, a medical internship at UCSD completed in 1970, a clinical associate position at the surgical branch of the National Heart and Lung Institute in Bethesda completed in 1973, a cardiothoracic surgery residency completed at Stanford in 1975 and general surgery residency completed in 1977, also at Stanford.

In 1967, he received the Roche award for the outstanding medical student at Stanford. In 1969, he received membership in the Alpha Omega Medical Honor Society and was chosen for the Smith & Kline Foreign Fellowship in Malagasy Republic.

Dr. Copeland began at the University of Arizona in July 1977 as associate professor, became a professor of surgery in 1981, associate director of the then-University Heart Center in 1986, co-director of the UA Sarver Heart Center in 1991 and since 1990 has been the Michael Drummond Distinguished Professor of Cardiovascular and Thoracic Surgery at the UA. He has been chief of cardiothoracic surgery at the UA College of Medicine since 1977.

In 1979, University Medical Center became one of only six heart transplant centers in the world when Dr. Copeland performed the hospital's first heart transplant.

A founder and past president of the International Society for Heart and Lung Transplantation, Dr. Copeland has marked many "firsts" in the two decades since his first heart transplant. They include the first use in the world of a total artificial heart as a "bridge to transplant," Arizona's first double-lung transplant and the first U.S. use of a "Berlin Heart" assist device designed for children.

Under Dr. Copeland's leadership, the University and UMC have become world leaders in the development of artificial hearts and heart devices. UMC is home to the CardioWest total artificial heart and is part of two important nationwide artificial heart trials.

In recognition of his contributions, Dr. Copeland was presented with the Barney Clark Award for advancement of artificial heart technology, presented by the American Society for Artificial Internal Organs, in 2001.

Dr. Copeland has authored or co-authored over 360 peer-reviewed papers and chapters. He also has authored or co-authored 167 abstracts that have been presented. His primary areas of interest have been adult and pediatric cardiac surgery, cardiac transplantation, artificial hearts and cardiac preservation.

Jack G. Copeland, MD

Achievements, Milestones and Firsts

1979 Cardiothoracic surgery program established at UA, UMC becomes one of the first six heart transplant centers in the United States

Mar. 6, 1985 UMC is site of the first use of a total artificial heart – the Phoenix Heart – as a “bridge to transplant”

Sept. 7, 1985 UMC marks first successful bridge to transplant with an artificial heart – the Jarvik 7 – when Michael Drummond, a 25-year-old Phoenix man, receives a new heart. The artificial heart he used is now in the Smithsonian Institution.

1985 First mobile intensive care unit (MOBI) designed to transport critically ill patients to UMC via Learjet

1987 UMC becomes one of the first three heart transplant centers in the nation authorized to receive Medicare funds for heart transplants

1987 UMC implants its first assist device in 1987 (Symbion VAD)

Mar. 27, 1990 Arizona’s first single-lung transplant, performed on Dale Linger, a 57-year-old Glendale man

Sept. 7, 1991 Arizona’s first combination single-lung transplant/coronary artery bypass

Feb. 1992 Arizona’s first percutaneous transluminal coronary angioplasty on a heart transplant recipient

Oct. 12, 1992 Arizona’s first simultaneous triple transplantation in the same hospital

Jan. 19, 1993 Arizona’s first double-lung transplant

Oct. 1993 The national study of the CardioWest total artificial heart is initiated with UMC as the center

Oct. 1993 UMC sets world record when Sharon Loughran of Scottsdale lives for 186 days on the CardioWest, the longest anyone had lived on an artificial heart prior to successful transplant surgery and discharge from a hospital

1998 UMC implants a Thoratec device in the smallest person ever to receive one. Willie Maskiell, who was 12 years old and 17 kilograms at the time, later underwent a successful heart transplant.

1998 First use in the world of Gortex pericardium in CardioWest implant

1999 UMC is first in world to perform an intra-abdominal Gortex pocket implant of a Novacor device

2000 Carlos Ochoa, a 7-year-old boy, becomes the first patient in the United States to receive a “Berlin Heart” assist device

May 30, 2001 A team led by Dr. Copeland successfully implants an Arrow LionHeart – a fully implantable mechanical heart assist device – in a 66-year-old man from Sun Lakes, Ariz. It’s the first time the device was implanted in Arizona.

2001 UMC is announced as one of the six centers selected for implantation of the initial series of AbioCor Total Artificial Hearts

2001 Dr. Copeland is presented with the 2001 Barney Clark Award in recognition of his success in the use of artificial hearts and heart-assist devices

Aug. 28, 2002 Ten-year-old Jesse Kolb becomes the youngest patient to undergo a double-lung transplant in Arizona

Oct. 7, 2002 Howard Cook undergoes a double-lung transplant, becoming the oldest cystic fibrosis patient to undergo the procedure in Arizona

2003 To date, more than 650 heart transplants, and 50 heart-lung transplants, have been performed.

How You Can Help Complete The Jack G. Copeland, MD, Endowed Chair of Cardiothoracic Surgery

- 1. Make an Immediate Gift** You may do this by sending a check to *UA Foundation/Copeland Chair*, or with a credit card over the phone
- 2. Pledge a Gift** A gift amount pledged over three to five years enables you to make an expanded commitment to the endowment. To receive a formal pledge form, please call us.
- 3. Consider a Gift of Stock or Property** Appreciated securities, bonds, stamps, coins, art or real estate are gifts that may provide tax advantages including forgiveness of capital gains taxes and current charitable contribution deductions.
- 4. Spread the Word** Help by inviting others to participate. Let us know if you would like a packet of informational materials mailed to friends or family members.
- 5. Celebrate Our Success** All donors to the endowed chair will be invited to a special celebration dinner upon reaching \$2 million. The tentative date is Nov. 7, 2003.

If you have any questions regarding The Jack G. Copeland, MD, Endowed Chair of Cardiothoracic Surgery or ways that you can help the Sarver Heart Center complete this tribute, please call Brian Bateman, Senior Director of Development, at (520) 626-4146 or 800-665-2328.

'Patient Empowerment' Levels Playing Field

Times are changing in medicine. And it's not just the technological advances and the new, more effective drugs.

Nope. What's changing is the patient, says Eric Topol, MD, the 2003 Samuel and Edith Marcus Visiting Professor.

In a talk titled "The Era of Patient Empowerment," Dr. Topol explained that there was a time when the doctor was superior and the patient was subservient. The doctor told the patient what the problem was and what to do, and the patient listened.

"Now we have this level playing field. The time of the patient is just as important as the time of the physician," noted Dr. Topol, who is chairman of the Department of Cardiovascular Medicine at The Cleveland Clinic. "There is not this sense of superiority by any means. The patient has truly been empowered."

In a humorous presentation given to cardiology faculty and guests at a dinner recently, Dr. Topol said this is a good thing – but brings the growing pains of any transition.

Among his observations:

- **There's one in every waiting room.** It's the "cyberchondriac," the person who has researched his or her symptoms on the Internet and made a diagnosis. For more and more people, Dr. Topol said, the Internet is becoming a primary source of medical information. With a click of the mouse, the average person can order tests for a wide range of conditions – cancer, fertility, DNA abnormalities.

"You can buy kits for anything now," he said, noting that there is no agency regulating the tests.

- **Doctors who think they are in charge of their patients' care should think again.** A large percentage of patients are seeing naturopaths, herbalists and other non-traditional specialists, Dr. Topol said.

about diets that have not been proven safe or effective over the long term – and enjoy high-calorie fast food on a regular basis.

"We have moved from the drive-thru era to the squeeze-thru," Dr. Topol said.

We already know the "cure" for weight problems: fewer calories and more exercise. Even though it has been

proven that at least 30 minutes of aerobic exercise most days of the week lowers cardiovascular risk, activity levels have steadily decreased, he noted.

"What is the average American waiting for?" he asked. "The magic pill."

- **Getting ready to do the taxes? Forget the calculator. Bring out the scale!** Safe drivers get breaks on their car insurance. Why shouldn't people who take care of themselves get discounts on their health insurance, Dr. Topol wondered.

Perhaps people who are not overweight – and therefore have a lower risk for cardiovascular disease – could even qualify for tax breaks.

Dr. Topol's vision: "On April 15, when you bring your tax form, you weigh in." ♥

The visiting professorship was established in 1997 by the sons and daughter of Jewish immigrants Samuel and Edith Marcus for the enhancement of education and research of students, residents, fellows and faculty in cardiology. Their children are Frank I. Marcus, MD, the founding chief of cardiology at the UA; Julius Marcus, a Florida businessman; and Shirley Feinberg, a personal shopper in New York.



Back row: Joy Fogel, Judge Wilfred Feinberg, Eric Topol, MD, Martin Lapidus, Frank I. Marcus, MD. Center: Shirley Marcus Feinberg. Front row: Lynn Marcus, Janet Marcus and Ann Marcus.

"Because people are fed up with traditional doctors, they turn to alternative providers."

But many aren't letting their traditional doctors know about the alternative providers, or about the substances they are taking that could be harmful, he added.

- **The Mediterranean Diet has been shown to lower cardiovascular risk, but no one knows about it because it can't be sold.** When there's no money to be made, according to Dr. Topol, it is unlikely an idea will get the widespread exposure of plans promoted by weight-loss gurus.

Meanwhile, Americans buy books

New Device Fixes Heart Defect Without Surgery

It wasn't until she became paralyzed on her left side that Linda Arnaud knew that anything was wrong with her heart.

She was swimming with her family on Mother's Day 2002 when she was struck with a terrible headache. Because she's always been healthy, she ignored it. After all, she had run in the Boston Marathon only a month before.

She realizes now that the headache wasn't the first sign – about three weeks before, after a routine dentist appointment, she had felt fatigued.

The day after Mother's Day, Linda was in her kitchen when her vision suddenly shifted to the left. Then her left arm and the left side of her face began shaking. She was having a seizure.

She fell down, got up, then had another seizure. Thankfully, one of Linda's friends called her cellular phone. After getting her 5-year-old daughter to answer it, Linda was able to let her friend know she was in trouble, and her friend came over and called 911.

Tests pointed to a brain abscess. After losing most of the movement on her left side, she underwent surgery to remove the abscess, and then suffered total paralysis on her left side.

After a regimen that included antibiotics and sessions with a massage therapist and an occupational therapist, Linda has been able to regain nearly all of the movement on her left side.

Doctors suspect her medical ordeal can be traced to a heart defect.

While in the uterus, every fetus has a small opening between the upper chambers of the heart called the foramen ovale, a shortcut that diverts blood from the right side of the heart to the left side – bypassing the lungs as the fetus is not yet breathing.

In most people, the foramen ovale closes at birth and heals over. But in a few people it remains open, or "patent," which also is usually not a problem.

"There are a lot of people walking around with this defect and it's not an alarming thing," says Samuel Butman, MD, director of the Cardiac Catheterization Laboratories at University Medical Center.

But, as in Arnaud's case, there can be dire consequences.

Doctors believe the dental cleaning introduced bacteria into her blood, which then passed from the right upper chamber of her heart to the left via the foramen ovale, and then made its way to her brain.

The biggest risk of having a patent foramen ovale (PFO) is stroke because it allows a blood clot to bypass the lungs, where it normally would be dissolved, and go directly to the brain. When a patient – particularly a young patient – has a stroke for no apparent reason, doctors typically check for a PFO.

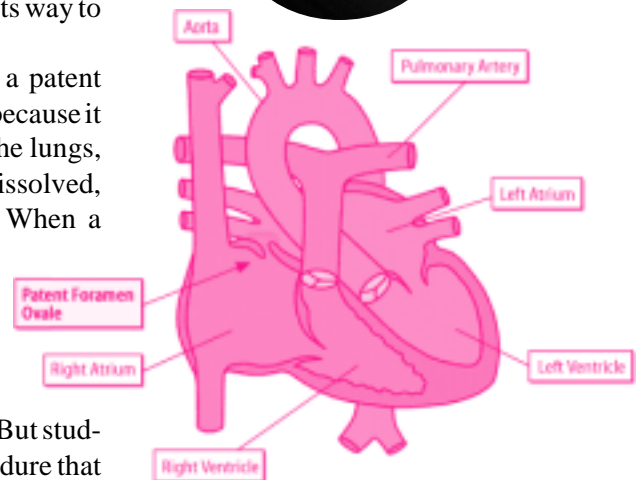
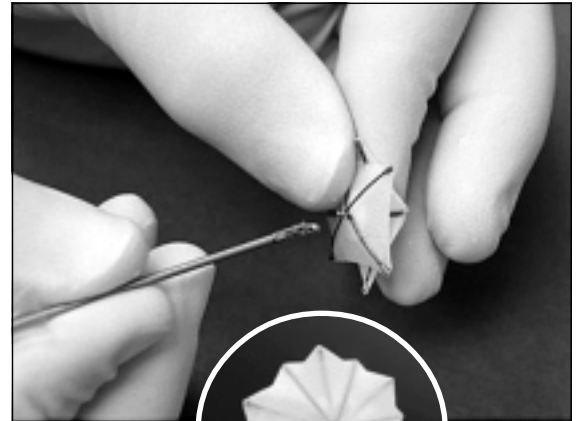
Until recently, the problem could only be fixed surgically. But studies are underway to test a procedure that closes PFOs via catheter.

In the procedure, which Arnaud underwent less than a year ago, a catheter is guided through a vein to the heart and across the hole through the atrial septum. Once the catheter is in position, it deploys two umbrella-like patches – one over the PFO's opening in the left atrium and one over the PFO's opening in the right atrium – effectively sealing both sides of the passageway.

Dr. Butman is participating in the study of one device and expects two other experimental devices also to be tested at UMC.

It is believed that PFO closure can reduce the risk of strokes. Anecdotal data suggests that it also may help alleviate migraines.

A similar device already is used rou-



Top: The two umbrella-like patches are collapsed into the tip of the catheter until they are deployed. Inset: a close-up of one of the patches. Bottom: A diagram showing the location of the PFO.

tinely to repair another heart defect, called an "atrial septal defect" (ASD).

ASD is when holes are left in the muscle (septum) that separates the two upper chambers of the heart during the heart's development in the womb. The condition is not life-threatening, but eventually can lead to right heart failure, higher risk of stroke, heart rhythm abnormalities and pulmonary hypertension (high blood pressure in the pulmonary artery). ♥

Tucson ~ February 15, 2003

Topics ranging from cardiopulmonary resuscitation to hormone replacement therapy were discussed at the Sarver Heart Center's annual Healthy Heart conference. Right: Karl B. Kern, MD, demonstrates "continuous chest compression" CPR. Below: two conference participants enjoy lunch.



Above: participants review information handed out during the conference. Right: Marietta Anthony, PhD, (left), associate vice president for women's health research at the Arizona Health Sciences Center, answers questions along with Beth Malasky, MD, a cardiologist with the Native American Cardiology Program.





More than 250 people attended a public education conference the Sarver Heart Center held in Green Valley. Left: moderator Bernard Klein and his wife, Gladys, listen to a presentation. Below: volunteer Mary Jane Clabots helps someone during the lunch break. Bottom: participants listen during a question and answer session.



Green Valley ~ March 1, 2003

HEART NEWS FOR YOU

CRP

C-reactive protein

*By Gordon A. Ewy, MD
UA Sarver Heart Center Director*

For the first time in nearly three decades, two of the nation's leading health organizations have recommended a new blood test to help doctors assess their patients' risk for heart disease.

Evidence has been building for several years that mild clinically silent infections or inflammation may play a role in causing heart attacks. One manifestation of clinically silent inflammation is C-reactive protein (CRP). Although some of us (based on the scientific literature) have been using this test for years, the American Heart Association and the Centers for Disease Control recently recommended that physicians consider CRP levels in screening their patients' risk for heart attacks.

CRP now joins the ranks of the major cardiovascular disease risk factors that we have known about for decades—smoking, high blood pressure, high LDL cholesterol, low HDL cholesterol, increasing age, family history, obesity, diabetes and a sedentary lifestyle.

Over the past few years there has been increasing interest in how inflammation contributes to the development of obstructions in the arteries, and especially in the breakdown of

these obstructions, which leads to blood clotting and sudden blockage of the arteries. Sudden blockage of a coronary artery causes a heart attack and sudden blockage of a carotid artery results in a stroke.

CRP is only one of many proteins produced by the liver in response to inflammation. But because it is stable and easy to measure it has become the standard.

In spite of the general endorsement by two national scientifically respected health care

CRP now joins the ranks of the major cardiovascular disease risk factors that we have known about for decades

groups, there are still many unknown aspects of CRP. First, it is unclear where in the body the chronic low-grade inflammation is located. Some evidence points to chronic inflammation in the atherosclerotic lesions in the coronary arteries. Other evidence points to chronic infection in other parts of the body, such as lung infections caused by *Chlamydia Pneumoniae*, repeated viral infections, etc.

The second unusual feature of CRP is that it is only predictive for cardiovascular disease when it becomes elevated in a healthy patient's previously defined "normal" range. That typically is a small difference, making it more difficult to measure, which led to the creation of the ultra-sensitive or high sensitivity CRP test, called the "hs-CRP" test.

Several illnesses, such as rheumatoid arthritis, result in CRP levels that are far above the

HEART NEWS FOR YOU

range of normal; it is unclear whether these very high CRP values also are predictive.

How might your physician use hs-CRP values? He or she might use them to decide whether you should be taking aspirin as a preventive measure. In the predominantly male Physicians Health Study – in which a large number of apparently healthy physicians were randomized to 325 mg of aspirin every other day or to placebo – it was found that those physicians who took aspirin (and who were over the age of 50) had significantly fewer heart attacks over the ensuing four years than the physicians randomized to placebo. This finding is the basis upon which physicians have recommended aspirin therapy to men over the age of 50 for primary prevention of heart attacks.

However, a recent analysis of blood samples obtained from the physicians at the start of the study found that those physicians with the very lowest levels of CRP had very few heart attacks and no benefit from aspirin. But the benefit of aspirin increased as the level of CRP increased. This confirmed the importance of aspirin in patients with high risk for the disease, but there was no apparent benefit for those with the lowest CRP levels.

Likewise, studies of large groups of patients given the cholesterol-lowering “statin” drugs have shown marked benefit. However, recent studies have shown that the benefit was greatest in those patients with elevated cholesterol and elevated CRP levels and less in those patients without elevated CRP levels.

Another use of this new hs-CRP blood test is as follows: If your LDL cholesterol level is only moderately elevated and your other risk factors, including CRP, are very low, therapy might not be recommended. In contrast, if your LDL cholesterol is only moderately elevated, a high CRP level would be considered an addi-

tional risk factor, suggesting that LDL cholesterol lowering with a statin type drug might be appropriate.

Why would an elevated CRP level increase the risk of a heart attack or stroke? CRP is produced in response to any infection in the body. The CRP attaches to the infective agent, making this agent more susceptible to uptake by the white blood cells fighting the infection. (As one person put it, it makes the infective agent “taste better” to the white blood cells). That is the good news. The bad news is that CRP also attaches to LDL cholesterol and enhances the uptake of LDL cholesterol by the white blood cells – a step that accelerates the process of atherosclerosis. Thus for any level of LDL, the risk is higher when the CRP level is higher.

The only thing that is constant in medicine is change. There have been a variety of novel risk factors that have been advocated over the years, including homocysteine levels,

CRP attaches to LDL cholesterol and enhances the uptake of LDL cholesterol by white blood cells – a step that accelerates the process of atherosclerosis

lipoprotein (a) or Lp (a) levels, and small dense LDL cholesterol levels, to name a few. Yet, the recommendation by two nationally respected organizations that CRP be added as one of our major cardiovascular risk factors is the first in decades, and is sure to impact health care practices for decades to come. ♥

Lab Sees Success in Heart Failure Work

Hear failure is among the most debilitating and costly diseases today. More than 400,000 new cases of congestive heart failure are reported each year and the estimated cost of heart-related patient care in the United States in 2001 was \$105 billion.

Drawing from disciplines ranging from engineering and physiology to cell biology and biochemistry, a research team led by Mohamed A. Gaballa, PhD, is looking for new treatments for congestive heart failure that could save lives and money.

The team's focus is on the changes that heart failure causes in the function of the heart and vessels.

In most cases, heart failure develops after one or more coronary arteries become blocked. When an artery is occluded, blood is prevented from reaching an area of the heart, causing the heart muscle to die. That area of heart muscle then is replaced with scar tissue, which is unable to contract and thus decreases the heart's ability to pump blood.

Unlike most other tissues, heart tissue has a limited ability to regenerate. Dr. Gaballa's lab is examining stem cells from different sources, such as bone marrow and umbilical cord blood, to see if they can be used to repair the damaged heart after a heart attack.

Dr. Gaballa already has been successful in developing a novel way to grow new heart tissue. Building upon other researchers' lackluster efforts to generate heart tissue by implanting cells in areas where heart muscle has died, Dr. Gaballa hypothesized that the cell growth was limited because the cells had nothing to hold onto as they grew, and therefore had difficulty connecting with existing



Mohamed A. Gaballa, PhD, (front) is shown with members of his research team: (from left) Nicholle Johnson, Kristi Magers and Julia Sunkomat, MD.

heart tissue.

He and other Sarver Heart Center researchers experimented with placing a "scaffold" made from collagen on the damaged tissue, giving the new cells a place to attach. The experiment concluded that the scaffold was exactly what the transplanted cells needed. They not only developed into cardiac tissue but formed new vessels.

Another major finding to come out of Dr. Gaballa's lab is a deficiency in a gene that synthesizes nitric oxide (the active ingredient in nitroglycerin).

"Based on this finding we designed a gene therapy technique to correct this gene," Dr. Gaballa said, adding that the lab continues to work toward new treatments that specifically target some of the molecular changes that occur in the vascular system during heart failure.

The lab also discovered a deficiency in a gene that makes beta-adrenergic receptors (which are blocked by beta-blocker medications). ♥

Dr. Woosley Earns Grant to Study Drug Interactions

A nearly \$4 million federal grant has been awarded to the drug interaction research initiative headed by Raymond Woosley, MD, PhD, UA vice president for health sciences.

Dr. Woosley is the principal investigator of the University of Arizona Center for Education and Research in Therapeutics (AzCERT), which focuses on preventing harm from drug interactions through research and educational programs. AzCERT is part of a national network of several centers, all based at academic health sciences centers.

The program was awarded \$3.9 million over five years by the U.S. Agency for Healthcare Research and Quality to continue its efforts.

“Patients and physicians need unbiased research to allow those who prescribe and those who take drugs to make informed and cost-effective choices of therapies,” Dr. Woosley says. “That is the key mission (of the CERT centers).”

AzCERT is devoted to education and research on prevention of adverse drug reactions that cause arrhythmias (heart rhythm abnormalities).

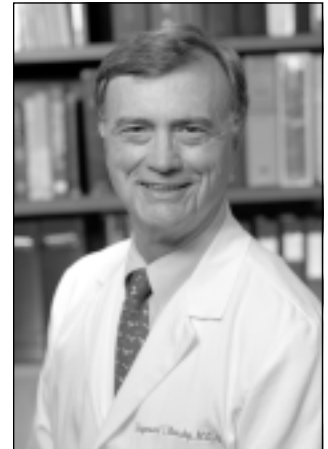
“Five of the 10 drugs removed from the market in the last four years

caused cardiac toxicity that resulted from adverse drug interactions,” Dr. Woosley notes. “These and many other drugs still marketed today have been shown to increase the risk of a potentially fatal arrhythmia,” especially in women.

The CERT concept was proposed years ago by Dr. Woosley, who wanted the federal government to estab-

lish a consortium of academically based centers focused on drug interactions. The AzCERT’s Pharmacodynamics Core is lead by Dr. Woosley and includes Julia Indik, PhD, MD, and Ellen Pearson, RN, MPH.

The other core areas are Pharmacoeconomics, Drug-Herbal Outcomes, Education and Women’s Health Research. ♥



Raymond L. Woosley, MD



Margaret Richardson Becomes Honorary Wildcat

Sarver Heart Center friend Margaret C. Richardson was presented with an honorary alumnus award at a surprise reception. From left: Richard F. Imwalle, president of the University of Arizona Foundation; Gordon A. Ewy, MD; Margaret C. Richardson; Sandy Ruhl, president of the UA Alumni Association; and Ken R. Dildine, vice president for planned giving at the UA Foundation.

Shaftners Establish Endowed Chair for Research

Dorothy Shaftner passed away on April 15, 2003. We extend our sympathies to the Shaftner family.

Bill and Dorothy Shaftner recently finalized plans for a series of deferred gifts that will form The William V. and Dorothy Bramble Shaftner Endowed Chair for Heart Research. The Shaftners plan to add to their previous contributions to The University of Arizona Foundation to form an endowed chair in the area of most compelling need for heart disease research at the Sarver Heart Center.

By establishing an endowed chair, the Shaftners have given the ultimate gift in support of academic medical research.

But don't attribute the couple's warm support of health care causes to Bill's side of the family.

His grandfather served as sheriff in a small Ohio town and vowed never to trust doctors, dentists or lawyers. Early in his career, a gun battle left the young lawman wounded in his right shoulder. True to his vow, he refused to let the doctor remove the bullet and lived with the pain in his right arm to the ripe old age of 92.

Dorothy Bramble was a Theta and Bill Shaftner was a Beta when they met at Ohio State. Both were English majors and went on to very successful careers that allowed them to retire to Arizona at a relatively young age.

Dorothy's focus turned to fashion when she landed her first job at an advertising agency that specialized in the industry. Macy's in San Francisco soon hired her as their fashion coordinator to choose clothing for displays and plan fashion shows. Her love of writing and the fashion

the war and was involved in counterespionage matters in the state of Montana and in Seattle and San Francisco.

Most of their married life they lived in Palo Alto, Calif., where Bill served on the board of directors of the Palo Alto University Club. He and Dorothy remained active with the club and developed many close friendships with Stanford alumni and faculty. Connections to members of this club eventually led them to Gordon A. Ewy, MD, director of the Sarver Heart Center.

Following their retirement to Arizona, Dorothy developed an aneurysm and Bill called a doctor friend at Stanford Medical Center to say he was bringing Dorothy directly there to be treated. The friend encouraged them to stay put and to see one of the finest cardiologists in the country, who was right there in Tucson. He knew the name had just three letters and when Bill mentioned Dr. Ewy, the friend con-

curred that this was whom they needed to see.

"Dr. Ewy and the staff at the Heart Center have really been key for us over the years," according to Bill. "If I could find a better place to put this money, I would do it." ♥



field led her to pen articles for magazines such as *Good Housekeeping*, *Family Circle* and *Woman's Day*. She also wrote two popular books for girls and young women exploring a career in fashion. Published by Putnam, "Kim Fashions a Career" and "Kim In Style" were behind-the-scenes looks at the work Dorothy cherished.

Bill's vocation in the Federal Bureau of Investigation began just before Pearl Harbor in the spring of 1941. He served as an FBI special agent during

Student Explores Role of Collagen in Aging Heart

The American Heart Association has awarded a \$20,000 fellowship to a doctoral student researching age-related changes in the heart.

The focus of Cory Alwardt's research is to show that age brings about problems in the cellular makeup of the heart, causing it to become more fibrous and stiff.

The cells of the heart muscle are held together by collagen, which helps organize the contractions of the individual cells into a synchronized pumping action in the left ventricle, which pumps blood to the brain and the body.

When there is too much collagen, the heart does not relax as well, which impairs its ability to fill the left ventricle. This condition, called relaxation dysfunction or diastolic heart failure, is related to 20 percent to 30 percent of heart failure cases.

The collagen structural support of the heart cells in the myocardium (heart muscle) is called the "extracellular matrix," an intricate and highly organized structure that serves to maintain functional integrity of the myocardium.

The quality and amount of collagen is regulated by the cardiac fibroblasts, which respond to, produce and release growth factors.

Abnormalities in the cardiac relaxation phase have been linked with "maladaptive remodeling" of the extracellular matrix, in which there is an abnormal amount of collagen in the heart muscle.

Alwardt's hypothesis is that the maladaptive remodeling is largely due to cardiac fibroblast dysfunction.

Little is known about the effect of aging on cardiac fibroblast function. The factors that regulate their function are important to define for the understanding of heart diseases associated with relaxation dysfunction.

Alwardt's study, titled "Age-Related Changes in Cardiac Fibroblast Function," proposes to determine the age-

related altered function of the cardiac fibroblasts, including collagen synthesis, secretion of and response to growth factors, and related changes in cardiac function.

Alwardt believes that older people have an altered expression of regulatory growth factors, which leads to an increased rate of collagen production.

He will experiment with pro- and anti-collagen growth factors to see their

effects on collagen production in both young and old heart muscle.

Alwardt's research will contribute to understanding the effect that aging has on the heart's relaxation function, and hopefully lead to the development of new ways to treat patients with relaxation dysfunction.

Alwardt, a physiological sciences doctoral student, is working in a Sarver Heart Center laboratory headed by Douglas F. Larson, PhD. ♥

SHC Lab Receives Award

A research team led by Douglas F. Larson, PhD, won an award for the most outstanding scientific paper at the 41st International Conference of the American Society of Extra-Corporeal Technology.

The paper – titled "A Mechanism of Diastolic Filling Dysfunction in the Aged" – explored the possible cause of increasing stiffness in heart muscle that occurs with age.

Other members of the team are Rene Ingham, Cory Alwardt and Bo Yang, MD, PhD.

The lab's work was supported by a gift from Drs. Del and Karen Steinbron to support research in heart failure.

A hallmark feature of the aged heart is increased fibrosis – or scarring – which results in diastolic dysfunction (an inability of the heart to relax between contractions, slowing the amount of blood entering the pumping chamber during "diastole" – the filling phase of the heart cycle).

In addition, older patients have worse survival rates after a heart attack, partly because the makeup of their hearts has undergone changes caused by cardiac fibroblasts (the cells that make up connective tissue).

The research team's hypothesis is that cardiac fibroblast dysfunction results because of an over-expressed growth factor (TGF-β1), leading to an increase in collagen in the older heart.



Del Steinbron, MD, and Douglas F. Larson, PhD

TGF-β1 stimulates the synthesis of the extracellular matrix proteins including collagen in the cardiac tissues. In a study of mice, there was a marked increase in the gene expression in older mice. Further, heart stiffness correlated with collagen amounts.

In conclusion, the gene findings supported the group's hypothesis that problems in the regulation of cardiac fibroblast production account for diastolic filling dysfunction in the aged. The results point to the need to revise perfusion techniques used in older patients.

SHC Members Present Research at National Cardiology Meeting

Several Sarver Heart Center members were invited to present their research findings to the American College of Cardiology at its Annual Scientific Session, held in Chicago this spring.

Dr. Marcus Receives Alumnus Award

Frank I. Marcus, MD, a founding member of the UA cardiology program, will be presented with a Distinguished Alumnus Award from Boston University School of Medicine in recognition of his outstanding career.



Dr. Marcus

Dr. Marcus attended Boston University after graduating from Columbia University at the age of 20. After receiving a master's degree in physiology from Tufts University in 1951, Dr. Marcus graduated cum laude from Boston University in 1953.

Dr. Marcus served as chief of cardiology at the Georgetown University Service at the DC General Hospital from 1960-68, and then was recruited to Tucson to become founding chief of the UA's cardiology section.

Dr. Marcus' research has focused on drug interactions and cardiac arrhythmias (irregular heart rhythms). He is considered an international expert in arrhythmogenic right ventricular dysplasia, a hereditary condition that accounts for a significant percentage of sudden deaths in athletes and young people.

Dr. Marcus will be presented with the award during a banquet in Boston in May.

The ACC is a 28,000-member nonprofit professional medical society dedicated to fostering optimal cardiovascular care and disease prevention through professional education, promotion of research, leadership in the development of standards and guidelines, and the formulation of health care policy.

The yearly conference is an opportunity for the international cardiology community to come together and hear the latest research discoveries and breakthroughs.

Below is a list of SHC members who presented original scientific data or delivered lectures or mini-courses.

Early Activation of Matrix Metalloproteinase After Myocardial Infarction in Rats (Poster Session)

Jason Wollmuth, MD, Nicholle Johnson, Steven Goldman, MD, Mohamed A. Gaballa, PhD

Aldosterone Antagonism Improves Endothelial Dependent Vasorelaxation in Heart Failure via a Nitric Oxide Mediated Mechanism (Poster Session)

Trunk Tran, MD, Kent G. Meredith, MD, Jason Wollmuth, MD, Steven Goldman, MD, Hoang Thai, MD, Mohamed A. Gaballa, PhD

Role of Endothelial Nitric Oxide Synthase in Arterial Remodeling in Heart Failure (Poster Session)

Mohamed A. Gaballa, PhD, Steven Goldman, MD

The Thyroid Hormone Analog, 3,5 Diiodothyropropionic Acid (DITPA) Restores Diminished Vascular Beta-Adrenergic and Endothelial Mediated Vasorelaxation in Heart Failure (Oral Contributions)

Peter H. Spooner, MD, Steven Goldman, MD, Mohamed A. Gaballa, PhD

Intracoronary Delivery of Bone Marrow-Derived CD34+ Mononuclear Cells Increases Vascular Density in Infarcted Myocardium (Oral Contributions)

Julia N. Sunkomat, MD, Mohamed A. Gaballa, PhD

Comparison of Weight-Based Monophasic and Fixed-Sequence Biphasic Defibrillation Dosing for Resuscitation in a Model of Pediatric Prolonged Cardiac Arrest (Poster Session)

Robert A. Berg, MD, Ronald W. Hilwig, DVM, PhD, Fred W. Chapman, Robert G. Walker, Richard C. Nova, PE, Marc D. Berg, MD, Karl B. Kern, MD, Gordon A. Ewy, MD

Functional Myocardial Angiogenesis Resulting From Persistent Systolic Perfusion (Poster Session)

Marvin J. Slepian, MD

Limiting Interruptions of Chest Compression (During Cardiopulmonary Resuscitation) (Mini-Course)

Karl B. Kern, MD

Preclinical Insights on Myocardial Ischemia (Oral Contributions, Co-Chair)

Steven Goldman, MD

The Complicated Myocardial Infarction Patient (Meet the Experts, Co-Chair)

Joseph S. Alpert, MD

Dr. Bates Given Award for Heart Failure Research

Kathryn L. Bates, DO, was selected as a 2003 AstraZeneca scholar in recognition of her research contributions.

Dr. Bates received a scholarship to attend and present her research at the American Federation for Medical Research Meeting this winter.



Kathryn L. Bates

Her presentation was titled "HMG-COA Reductase Inhibitor, Simvastatin, Enhances AKT Protein Levels in Heart Failure."

UA medical resident Abhijit A. Shinde, MD, also was selected as a scholar. His presentation was titled "Concurrent Amiodarone Therapy Increases Implantable Cardiac Defibrillator Discharges in Patients with High Risk for Sudden Cardiac Death."



Medtronic Funds Electrophysiology Research

Medtronic, a company that manufactures pacemakers and other devices, is helping to fund the research of Julia Indik, MD, (center) the Sarver Heart Center's first cardiac electrophysiology fellow. Pictured with Dr. Indik are, from left: Mike Wohlleb, senior sales representative for Medtronic; J. Wade Haskell, district manager for Medtronic's Tucson District; Peter Ott, MD, director of the UMC Electrophysiology Laboratory; and Frank I. Marcus, MD, who was UMC's first electrophysiologist.

Become an Organ Donor... Online!

Becoming an organ donor just got a lot easier.

Arizonans now are able to register their intent to be an organ and/or tissue donor via the Donor Network of Arizona web site. Registering ensures that one's wishes are carried out – regardless of whether the donor has informed family members of his or her decision.

To join the registry, or for more information, visit www.dnaz.org or call 800-94-DONOR.



Endowment Gift

Desert Toyota owner Brent Berge (right) presents a check to Richard G. Smith, director of UMC's Marshall Foundation Artificial Heart Program. The gift will go toward The Jack G. Copeland, MD, Endowed Chair of Cardiothoracic Surgery.

FROM THE DIRECTOR



The highlight of this issue of the Sarver Heart Center newsletter is the announcement of the effort to fund an endowed chair in honor of Jack G. Copeland, MD. Jack has made many unique and important contributions to the field of cardiovascular surgery that have helped patients in Arizona

and indeed around the globe. The list of his team's original and pioneering accomplishments in cardiac surgery, heart transplantation and mechanical heart assist devices is truly mind-boggling (see page 3).

This endowed chair will honor Dr. Copeland by supporting the work of the cardiothoracic surgery team now and in perpetuity. The endowment has been established at The University of Arizona Foundation, which will distribute a set percentage from this endowed fund annually to support the most important needs of the doctors and scientists working in cardiothoracic surgery.

The Sarver Heart Center's goal of "... a future free of heart disease and stroke" will not be realized by just diagnosing and treating patients. Our clinical mission must be accompanied by the education of future doctors and surgeons in additional to groundbreaking research advances. Despite the tremendous work that Jack's team does every day – from bypass surgery to heart transplantation – it is not enough. In order to advance the search for treatments and the ultimate cure, they also must be afforded the opportunity to focus on research and education.

This permanent source of financial support will allow the team to do that.

Dr. Copeland has gained a worldwide reputation by boldly challenging the limits of surgical treatment for end-stage heart disease. For 25 years, he has gathered a talented, committed team of medical professionals who have taken advantage of the newest technology and up-to-date medical research to provide unparalleled care to the sickest people in the southwest.

Those who have an interest in ensuring that this progress continues – while also honoring Jack's accomplishments – may join us by contributing to The Jack G. Copeland, MD, Endowed Chair of Cardiothoracic Surgery.

Sincerely,

Gordon A. Ewy, MD
Director, UA Sarver Heart Center

The *UA Sarver Heart Center Newsletter* is published regularly. News reporters are welcome to quote from newsletter articles and are kindly asked to provide credit. Correspondence or inquiries should be addressed to: UA Sarver Heart Center, Public Affairs, PO Box 245046, Tucson, AZ, 85724-5046.

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